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Expression of antioxidant enzymes in diseases of the human pancreas: another link between chronic pancreatitis and pancreatic cancer.

Cullen JJ, Mitros FA, Oberley LW.

Department of Surgery, University of Iowa College of Medicine, Iowa City, Iowa, USA. joseph-cullen@uiowa.edu

INTRODUCTION: Chronic pancreatitis is a significant risk factor for pancreatic cancer and is associated with the generation of reactive oxygen species. Cells contain a large number of antioxidants to prevent or repair the damage caused by reactive oxygen species. There are three major types of primary intracellular antioxidant enzymes in mammalian cells: superoxide dismutase (SOD), catalase, and peroxidase, of which glutathione peroxidase is the most prominent. AIM: To determine the level of antioxidant enzymes in human pancreas from normal, chronic pancreatitis, and pancreatic cancer specimens. METHODOLOGY: Immunohistochemical analysis for manganese SOD, copper/zinc SOD, catalase, and glutathione peroxidase expression using the avidin-biotin-peroxidase complex method was performed on pancreatic specimens previously fixed in formalin and embedded in paraffin. A quantitative digital imaging methodology was used to examine antioxidant staining in the pancreatic tissue. Cytoplasmic regions of ductal and acinar cells were identified and digitized. Mean gray-level pixel values were then obtained for each of these regions. RESULTS: Cytoplasmic values of manganese SOD, catalase, and glutathione peroxidase were decreased in pancreatic cells from chronic pancreatitis specimens when compared with normal pancreas. In pancreatic carcinoma specimens, mean cytoplasmic gray-level values of all antioxidant enzymes were decreased when compared with normal pancreas. CONCLUSION: There appears to be a gradual decrease in antioxidant enzyme expression in pancreatic cells from normal pancreas to chronic pancreatitis to pancreatic cancer.

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